



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## THE PRECIPITIN REACTION IN THE URINE IN PNEUMONIA

WILLIAM J. QUIGLEY

*From the Memorial Institute for Infectious Diseases, Chicago*

Avery and Dochez<sup>1</sup> have shown that a soluble substance is diffused through the medium during growth of pneumococci, that it is elaborated by the growing organism, and not the result of death of the culture. They showed that it is also formed in pneumococcal infection in man, being demonstrable in the urine and blood by precipitation with specific serum. According to a later report<sup>2</sup> the urine of 80 patients, sick with pneumococcus infection (Groups I, II and III) has been examined and specific reactions obtained in 65%. The mortality in this series led to the suggestion that the presence of the reacting substance in the urine is indicative of severe intoxication, and of unfavorable prognostic significance.

I have made study of the sputum for the type of infection, and of the urine for precipitin reactions in 100 cases of lobar pneumonia due to the pneumococcus, occurring in Chicago during the present winter. Cultures from the sputum were made on blood-agar plates or intraperitoneal mouse inoculation made of sputum; the organisms thus obtained were tested for bile solubility and for agglutination by specific serum (Rockefeller Institute). There were 33 instances of infection with pneumococci of Type I, 36 of Type II, 13 of Type III, and 18 of Type IV. The proportions are similar to those reported by Avery, Chickering, Cole and Dochez,<sup>2</sup> from a study of 454 cases with the percentages of 33, 33, 13 and 20, and covering a period of several years. Hence the incidence of type in pneumococcus infections may be quite constant through different seasons and localities. In the group of cases quoted 4% of the pneumococci were of Subgroup II, that is, they were agglutinatable by undiluted Group II serum, but not in dilution of 1:20. I found but 1% of this subgroup.

The urine, and in some instances the blood serum, were tested at 2 or 3 day intervals during the course of the disease for precipitin

Received for publication March 12, 1918.

<sup>1</sup> Proc. Soc. Exper. Biol. and Med., 1916-1917, 14, p. 126.

<sup>2</sup> Avery, Chickering, Cole and Dochez, Monographs of the Rockefeller Institute for Medical Research, 1917, 7, p. 34.

reactions with the 3 types of antipneumococcus serum. Small quantities of urine clarified by centrifugation, were stratified with equal amounts of immune serum in small agglutination tubes, incubated for 1 hour and observed at intervals. The precipitate usually appeared within 15 minutes, if at all; in a few cases only after incubation for  $\frac{1}{2}$ -1 hour.

Of 82 cases of Types I, II and III, the urine of 67 (81%) showed at some time during the disease a specific precipitin reaction. The strength of the reaction gradually increased during a period of 3 or 4 days, persisted from 2-19 days, and gradually disappeared. It was present during the 3rd week in a few convalescents when discharged from the hospital. There was no regularity as to the period in the disease at which it appeared, nor as to how long it persisted. Reac-

TABLE 1  
RESULTS OBTAINED IN 100 CASES OF LOBAR PNEUMONIA

Types of Pneumonia	Incidence of Types	Specific Precipitin Reaction in Urine		Mortality			
		Positive	Negative	Positive Precipitin Reaction in Urine		Negative Precipitin Reaction in Urine	
				Recovered	Died	Recovered	Died
I	33	24	9	14	10	6	3
II	36	32	4	20	12	3	1
III	13	11	2	10	1	2	0
Total	82						
IV	18						
Total	100	67	15	44	23	11	4

tions were first positive as early as the 2nd day of the illness, and as late as the 21st day during convalescence. They seemed not to be influenced by the crisis.

As to mortality, 30 of the 100 patients died. The group mortality was approximately 39%, 36%, 8% and 17%, respectively, for the 4 types. Of the 27 deaths due to Type I, II and III infections, 23 showed a precipitin reaction in the urine; 4 were negative. Of the 67 showing a precipitin reaction 23, or 34%, died. Of the 15 with negative reactions 4, or 27%, died.

It therefore appears that a large percentage of fatal cases of pneumonia have a substance in the urine capable of giving a specific precipitin reaction with antipneumococcus serum, but that the presence of this substance in the urine is not of great unfavorable prognostic value, as the mortality when it could not be demonstrated was only

slightly lower than when it was present. In every instance in which a precipitin reaction occurred it was specific for the serum corresponding to the type of organism present as determined by agglutination of the pneumococcus isolated from the sputum. When this reaction is present in the urine it is an accurate means, and at present the most simple and rapid means of type determination, and is, according to my results, present in 81% of cases due to Type I, II and III infections, although not always sufficiently early to warrant neglect of the sputum examination for the type of infection.